ROCKWELL COLLINS IN INDIA

Offering experience and commitment worldwide.
Bringing Rockwell Collins experience and talent to your project

How do we summarize Rockwell Collins’ 75+ years of experience in aerospace and defense? “We build trust every day.”

Rockwell Collins is expanding its global footprint including investing in India. The opening of our India Design Center (IDC) in Hyderabad reflects our responsiveness to customer needs. We understand the importance to customers in India of having an aerospace and defense provider with a local, indigenous presence. At the same time, with our India Design Center we are offering our worldwide customers access to top-notch, around-the-clock engineering talent backed by Rockwell Collins’ extensive experience in developing innovative avionics, communications, navigation and electronic solutions.

Our vision for Rockwell Collins in India is to support local and international governments, aerospace OEMs, and contractors with engineering design services and systems that can help customers achieve a shorter time to market, at a lower program or project life cycle cost, with the highest quality, innovative solutions.

We offer customers indigenous products and services including Rockwell Collins’ complete range of capabilities in avionics, communications, navigation and electronics. In addition, Rockwell Collins in India offers customers an entire international business team to champion sales, marketing, strategy, engineering, operations, services and support for your pursuits. This level of offering will continue to keep our worldwide customers at the forefront of technology and innovation.

Rockwell Collins in India offers customers

- Access to high quality engineering talent
- Faster collaborative product development
- Shorter time to market
- Lower program life cycle costs
- Proven quality performance
- Backed by Rockwell Collins’ extensive engineering experience and domain expertise in aerospace and defense avionics, communications and electronic solutions
- The peace of mind and sense of trust associated with utilizing industry leader Rockwell Collins
Rockwell Collins India Design Center engineering capabilities

Rockwell Collins is a recognized leader in the design, development and production of aerospace and defense avionics, communications, navigation and electronics. Our India Design Center is leveraging the capabilities, experience, processes, technologies and proven success of over 75 years of delivering on our promises to customers.

Displays
As a leader in aircraft and ground vehicle display capabilities, Rockwell Collins is providing customers with a full range of displays capabilities including head up, head down and helmet mounted displays for aircraft and ground vehicles. Our display systems work to enhance situational awareness, utilizing low-power, high-resolution, active-matrix liquid crystal display (LCD) technology. Featuring sharp color and high resolution, our displays provide clarity, reliability and exceptional cross-deck visibility as information is gathered, processed and analyzed. This enables the flight crew and ground vehicle operators to make vital decisions.

Flight management systems
Rockwell Collins’ advanced flight management systems (FMS) combine workload-reducing automation on the flight deck with true multisensor navigation capability. The result – seamless takeoff-to-touchdown flight guidance, direct-to-anywhere simplicity and significantly improved eyes-up display capability for aircraft.

Communications
As an established leader in communication technologies and solutions, Rockwell Collins combines products from across our business to provide robust and fully integrated communications systems. This flexibility enables us to provide custom communication applications tailored to meet our customers’ needs. Our communications solutions are keeping pilots, soldiers and others connected both in the air and on the ground, enabling efficient and effective airspace and battlespace operations.

Data links
As airspace becomes more demanding and requirements continue to evolve, you can be assured that Rockwell Collins is at the technological forefront to keep you connected while in the air and on the ground – anywhere in the world. Our data link solutions offer the latest in digital technology that are cost effective while providing unprecedented flexibility and growth.

Navigation and landing systems
Capitalizing on our leading Global Positioning System (GPS) and GPS Landing Systems (GLS) expertise, Rockwell Collins has streamlined today’s air traffic management systems. With our family of GPS-based Multi-Mode Receivers (MMRs), Rockwell Collins delivers precise navigation and autoland capabilities in any weather. As flight navigation and landing technologies advance, so will Rockwell Collins, using those advancements to your advantage.

Weather radar systems
MultiScan™ Hazard Detection Radar is a whole new kind of weather radar system, founded on a whole new category of weather detection, display and analysis capabilities. It represents a monumental shift in airborne weather radar, going beyond mere weather detection by offering predictive weather analysis and hazard detection features for the varying types of weather around the world. This frees pilots from the labor-intensive manipulation of manual radar, giving them a simple way to determine the safest, smoothest and most efficient flight path.

Information management
Rockwell Collins’ information management solutions enable customers to replace paper-intensive manual processes with electronic database and document management services. These advanced solutions provide enhanced electronic information between the aircraft and ground operations, which translates into faster turn times and meaningful cost savings.

Military flight deck applications
Rockwell Collins’ military aircraft flight deck applications are based on our innovative Modular Open System Approach (MOSA) that uses widely adopted open industry standards, minimizing the costs of technology insertions and capability upgrades. Our flight deck applications incorporate cockpit flight and mission management, as well as integrate multiple communications, navigation, weapons and mission sensor subsystems for reduced crew workload and improved operational effectiveness and safety.

Hardware design
As a manufacturer of hardware for aerospace and defense avionics, communications and electronics, Rockwell Collins designs and develops high quality, rugged, high performance hardware for integration into a broad range of products, systems and solutions.
# Engineering expertise – our knowledge will be your greatest asset

## Software engineering design
- Senior level engineers in computer science, electronics backed by Rockwell Collins’ extensive industry experience
- Proficiency in operating systems
- Ethernet protocol development (802.1Q), routing protocols, TCP-UDP/IP communications, etc.
- Embedded technologies utilizing software design and model based development/verification using programming languages such as ADA/C/C++
- Avionics protocols, DO-178B standards and processes, structural coverage testing, RTOS and AdaMulti IDE

## Systems engineering
- Engineers with on-site experience having worked in project planning and execution areas, backed by Rockwell Collins’ extensive experience in electronics, aeronautical aircraft/system platform integration, requirements capture and documentation
- Tools such as DOORS, military standards and specifications, ARINC standards
- Avionics architectures, communication networks, aircraft product level safety and reliability analysis

## Software quality engineering
- Potential defect identification in all phases of SDLC
- Detailed exposure on thread analysis and trace analysis
- Alternative technical approaches, with familiarity in coding and certification standards
- Aviation standards (DO-178B/AS9100)

## Hardware engineering design
- Senior level engineers in electronics, mechanical and electrical backed by Rockwell Collins’ extensive industry experience
- Schematic entry (multiple sheet entries/flat/hierarchical design)
- Multilayer PCB design, EMC Advisor/SI/EMI-PI
- Mechanical design concepts related to 2D-3D solid modeling (parametric and history based)/materials selection/GD&T/vibration and stress/third angle projection/electronic packaging

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## Sample projects at a glance

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<th>Avionics systems</th>
<th>Avionics systems</th>
<th>Flight management systems</th>
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| **Terrain Awareness and Warning System (TAWS) verification and validation**  
– Development of test cases and procedures for BOOT, hardware device drivers, common computing module operational software and high resolution terrain database  
**Model based engineering for Electronic Flight Information System (EFIS) DO-178B Level A software development**  
– Analysis and resolution of Problem Reports (PRs)  
**ARINC 661 Graphics Server (AGS) software development**  
– Development of test procedures for widget libraries as per DO-178 Level A specification  
**Electronic checklist tool development**  
– Analysis and resolution of Problem Reports (PRs)  
**Military heavy lift helicopters**  
– Development of test system and software implementation of new features  
– Development of test scripts for achieving coverage analysis; software design and implementation of new flight display features and test  
**ARINC 661 Graphics Server (AGS)**  
– Development of test procedures for widget libraries for MFD program per DO-178B Level A specification  
**Control Display Unit (CDU) page function development and verification**  
– Analysis and resolution of Problem Reports and updating test scripts for new requirements  
**Interactive CDU page function development and verification**  
– Development of dialog boxes |
|                    | **Airbus A350 Information Management Onboard (IMO) development and verification**  
– Development of Ethernet Network and Router Module (ENRM) and Communication Router Module (CRM) |

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Challenge

Rockwell Collins’ Printed Circuit Board (PCB) design department supports worldwide product development and manufacturing. The PCB team worked with offshore partners for three years. Tools and processes matured somewhat, but collaboration between locations still had room for improvement. The Printed Circuit Board Global Services Manager, Kim Osborn, was challenged to make a virtual team as effective as a co-located team, and to ensure seamless collaboration and transition of work to the India Design Center (IDC) while maintaining the highest quality standards and compressing cycle times.

Solution

In addition to working with the IDC engineering manager to structure the best team to engage for the PCB design project, Kim adjusted her department’s design and collaboration processes to include close integration of the IDC team. She implemented a special mentoring program to ensure the IDC team was working with the same level of domain knowledge so that the IDC team could go forward as a true customized extension of her engineering team. Export compliance, contracts and administrative processes were streamlined to ensure adherence to requirements and also to improve cycle time expectations. All of these actions contributed towards the highest level of success.

Results

The IDC engineering team is ramping up in record time, quickly gaining the knowledge and understanding of the many aerospace and project specific nuances. With day-to-day and sometimes hourly contact via email and instant messaging between the PCB engineering team and the IDC team, the time zone difference is used to the best advantage in this virtual collaboration environment. With the ability to work two full-time shifts utilizing the IDC, the PCB engineering team is able to compress cycle times and reduce costs, while maintaining the highest quality work product.

“Building a customized engineering team for Printed Circuit Boards

“The Rockwell Collins India Design Center engineers are extremely motivated, doing whatever it takes to get the job done. I have enjoyed mentoring and working with this new extension of our engineering team.”

Tom Sickels, Principal Engineering Manager
Rockwell Collins

“Working with the India Design Center gives us direct access to a highly educated and skilled engineering pool. The new collaboration model enables us to provide efficient and effective design services for our engineering teams. And, with increasingly more positive results, the IDC will help us grow the company through the addition of external customers.”

Kim Osborn, Global Services Manager
Rockwell Collins
Rockwell Collins Technical Consistent Process (TCP) – an engineering methodology that produces success every time

Rockwell Collins is unique in our approach to taking customers from concept to market. When doing business with Rockwell Collins, you get a combination of experience, dedication and proven engineering design methodology to ensure the fastest time to market at the absolute lowest life cycle cost.

Our TCP engineering methodology is:

**Proven** – based on 75+ years of developing and implementing avionics, communications, navigation and electronic products and solutions.

**Consistent** – we apply the same design processes and principles to each project or program, whether it’s a product for business aviation or military ground vehicles.

**Adaptable** – we fine tune or customize our process to the customer’s specific requirements, ensuring the specific idiosyncrasies of each and every program or project are addressed and leveraged.
Staying competitive in the global marketplace

Challenge
Roger French, a 30+ year employee of Rockwell Collins, has spent the last 10 years of his career finding and managing relationships with outside engineering contracting firms to augment the Rockwell Collins engineering team. His primary responsibility is to identify the best set of engineering resources for getting our projects done, utilizing contractors from places such as Russia, China and India. Given his experience working in India, Roger was tasked with assisting in building an aerospace experienced team at the Rockwell Collins India Design Center (IDC).

Solution
Working with the IDC, he and the recruiting team focused on hiring aerospace experienced senior engineers. These seasoned engineers have the domain expertise needed for Rockwell Collins programs and projects and are mentoring engineering graduates from India universities as the center grows its staff. Roger and the hiring team brought on the first group of engineers for the IDC, as well as worked with Rockwell Collins e-Business to implement the technology infrastructure and provide the engineering tools required. Roger worked closely with various Rockwell Collins engineering departments and IDC management to establish the initial flight management system and displays work packages for the IDC.

“\nThe engineering team has met our expectations and challenges in a number of avionics and electronics related areas. The IDC engineers provide value to our projects and programs and to the company overall.”

Roger French
Principal Engineering Manager
Rockwell Collins

Benefits
Today, it is clear that the IDC engineering team is motivated and highly respectful of the quality that goes into Rockwell Collins aerospace avionics, electronics and communications products. They are eager to learn as much as possible from tenured Rockwell Collins engineers about our products and systems and the processes we use to develop them. Now Rockwell Collins Commercial Systems is able to give larger, more complete segments of work to the IDC unlike when we contract with outside engineering firms. And with cost effective IDC labor rates, programs are beginning to benefit. Going forward, Roger believes the IDC will be integral in enabling Rockwell Collins to remain extremely competitive in the global marketplace.

Rockwell Collins India Design Center organization and facility

Rockwell Collins’ India Design Center is a part of the Rockwell Collins International Business organization led by Walter (Woody) Hogle, Senior Vice President, reporting to Clay Jones, Chairman, President and CEO. The India Design Center enables Rockwell Collins to present the best of breed solutions across our entire enterprise to our customers in India and worldwide. Rockwell Collins’ IDC facility is 90,000 square feet and can house 500 engineers. The networking and communications infrastructure within the facility is state of the art and has built-in redundancy and communications and network monitoring systems.
Building trust every day.

Rockwell Collins delivers smart communication and aviation electronic solutions to customers worldwide. Backed by a global network of service and support, we stand committed to putting technology and practical innovation to work for you whenever and wherever you need us. In this way, working together, we build trust. Every day.

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